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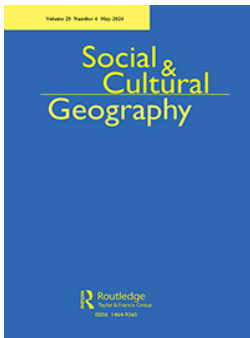
16 August 2024

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Published online: 12 Apr 2024.

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School buildings as performative machines: the new architectural devices of control

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ABSTRACT

The past two decades saw a growing attention to the role of design for the geography of education and simultaneously shifted architectural attention towards the understanding of different forms of pedagogy. Yet, careful empirical engagements with the material architecture of contemporary school buildings and the experiences they mediate are still scarce or missing. Focussing on how mechanisms of control are imagined and practiced in the design and use of school buildings, this article fleshes out a picture of the performative spatial machinery of schools. It will do so drawing on designers' accounts, plans and visions for a Building Schools for the Future (BSF) building in Liverpool, UK and on accounts of the experiences of different school dwellers. Overcoming the dualist understanding of education as an activity that happens in objective frames of learning (the static architecture of the schools) or the subjective interpretations of users (the perception of teachers and students), we trace specific practices of 'dwelling' in the school building and identify architectural and designerly techniques for modulating control. Instead of dissipating or reducing control, or merely reproducing the classic forms of power, this versatile and porous type of architecture, we argue, multiplies and diversifies the forms of 'polycentric' control exercised through various intersecting lines of sight and sound.

RESUMEN

En las últimas dos décadas se ha visto una creciente atención al papel del diseño en la geografía de la educación, simultáneamente cambiando el enfoque arquitectónico hacia la comprensión de diferentes formas de pedagogía. Sin embargo, la interacción empírica y cuidadosa con la arquitectura material de los edificios escolares contemporáneos y las experiencias que estos median es todavía escasa o inexistente. Centrándose en cómo se imaginan y practican los mecanismos de control en el diseño y uso de los edificios escolares, este artículo desarrolla una imagen de la maquinaria espacial performativa de las escuelas. Basándose en los relatos, planes y visiones de los diseñadores para un edificio parte de *Building Schools for the Future* (BSF por sus siglas en inglés) en Liverpool, Reino Unido, y en los relatos de las experiencias de

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diferentes usuarios de las escuelas. Superando la comprensión dualista de la educación como una actividad que ocurre en marcos objetivos de aprendizaje (la arquitectura estática de las escuelas) o las interpretaciones subjetivas de los usuarios (la percepción de profesores y estudiantes), rastreamos prácticas específicas de 'habitar' en la escuela e identificamos técnicas arquitectónicas y de diseño para modular el control. En lugar de disipar o reducir el control, o simplemente reproducir las formas clásicas de poder, sostenemos que este tipo de arquitectura versátil y porosa multiplica y diversifica las formas de control 'policéntrico' ejercidas a través de varias líneas de visión y sonido que se cruzan.

RÉSUMÉ

Au cours des vingt dernières années, le rôle de la conception a reçu une attention croissante dans la géographie de l'enseignement, tandis qu'en même temps, l'intérêt de l'architecture s'est transféré vers l'appréhension de formes de pédagogie diverses. Pourtant, les engagements empiriques prudents avec l'architecture concrète des bâtiments scolaires et les expériences qu'ils accommodent sont encore rares ou non existants. En se concentrant sur les techniques par lesquelles la conception et l'utilization des bâtiments scolaires imaginent et mettent en pratique des mécanismes de contrôle, cet article dépeint une représentation de leur machinerie spatiale performative. Pour cela, il s'appuie sur des témoignages de concepteurs, leurs plans et leurs visions pour un établissement du projet Building Schools for the Future (BSF) à Liverpool, au Royaume-Uni, et sur des récits de plusieurs utilisateurs. Nous allons par-delà la compréhension dualiste de l'enseignement comme activité qui prend place dans des cadres objectifs d'apprentissage (l'architecture statique des établissements) ou les interprétations subjectives de ses usagers (les perceptions des enseignants et des élèves) pour dépister des pratiques précises de « résidence » dans le bâtiment et nous distinguons des techniques architecturales et conceptuelles de modulation de contrôle. Nous soutenons que, plutôt que d'estomper ou de réduire le contrôle, ou de juste reproduire les formes traditionnelles de pouvoir, ce type d'architecture versatile et perméable multiplie et diversifie les formes de contrôle « polycentrique » qui s'exercent par le biais de lignes entrecroisées de vision et de son.

Introduction

The significant investment into school building across the world in the 21st century attests to the assumed transformative potential of school architecture. A new generation of 'student centred' school buildings have appeared which intend to support new and emerging pedagogies. They excelled with distinctive transparent, flexible and adaptable architecture providing open and versatile spaces. Yet, while much attention has been paid to the buildings which materialize from school building schemes, such as the UK's Building Schools for the Future (BSF), and the ways their designs reflect change in educational approaches, less focus has been placed on the realities of schooling mediated through these built forms. How do the *spatial dimensions* of education matter for teaching and learning? How can we approach the alterity and the alterations of educational

experiences in contemporary school buildings? To fully understand the impact of new schools it is crucial to turn *towards the world of the school itself*.

This article will draw attention to *the situated spatiality of the process of schooling*, focussing in particular on the way in which mechanisms of control and discipline are facilitated by specific design features and architectural devices for navigation in space in these new schools. Control and discipline have long been positioned as being central for the design and operation of schools with Foucault, (2020) analysis of panopticism often acting as a fruitful theoretical lens. Yet many of the aspects associated with control, such as the cell-like arrangement of classrooms along long corridors, have increasingly fallen out of favour, leading to new, more fluid mechanisms of regulating school life (Dovey & Fisher, 2014).

We will begin with an analysis of studies of contemporary school architecture, covering the fields of architectural studies, education studies and geographies of education. This will focus on, firstly, dominant ideas and trends within the design of schools including those connected with the UK Government's BSF scheme in the 2000s; secondly, studies which highlight the role of space in the practice of schooling, and finally, practices of discipline within school buildings.

The article will then outline its case study, a BSF secondary school in Liverpool designed by BDP architects, a large UK-based architecture and engineering firm with activities across multiple sectors. Opened in 2011, this school is one of a number that BDP designed in the Liverpool area in the 2010s. Fieldwork was conducted in this school as part of an ESRC-funded project, consisting of participant observation in the building undertaken between November 2021 and April 2022, four in-depth semi-structured interviews with staff members (a teacher, financial officer, facilities manager, and a member of the support staff team) and 12 group workshops undertaken with sixth-form students, exploring different elements of the design and experience of the building (Trafi-Prats, 2023). While the workshops differed in focus – including mapping and modelling exercises (Trafi-Prats & de Freitas, forthcoming) – they also provided a valuable opportunity to observe the sixth-form pupils as they reflected on and moved throughout the various spaces of the school. In conjunction with these methods, we also drew upon the Design and Access document[1] for the school to unpack some of the logics and intentions which drove the design choices. We performed a semantic analysis of this key document to create a key term semantic network map using the textual analysis software *Cortext* which screened the document for key terms and linked them based on the frequency with which they appear together. Drawing on all these sources, both discursive and non-discursive, we analysed the various spatial techniques through which schooling experience is modulated and control is mediated.

After a short overview of the building, and the school building it replaced, the analysis will proceed in two stages. It will first outline the logics of pedagogy and control which underpinned the design of the school (relying on analysis of architectural drawings, the Design and Access statement, and interviews with staff members). Secondly, it will explore the practices of control, discipline, learning and dwelling which were facilitated by the specific architecture (drawing on analysis of interviews, observation and pupil workshops). Through this analysis we will argue that it is in this gap, between the logics underpinning the school design, and the building as it becomes embedded in the realities of schooling, that we can begin to elucidate the experience and modulation of control.

The school becomes a 'performative' machine, highlighting the materially mediated tactics which multiply the mechanisms of control both envisaged by the designers, and which emerge in dwelling. This draws upon a 'performative' (Latour, 1986) understanding of power, in which power and control are positioned as effects which emerge in practice rather than inherent qualities. Building on the work of geographers of education and bringing this literature into dialogue with recent scholarship in architectural humanities, our study aims at understanding the spatial choreographies of schooling at a molecular level, as a symmetric interplay between buildings and dwellers, and the manifold ways issues of authority, discipline and control get translated spatially and negotiated architecturally. It will suggest that dwellers in a school move in and out of surveillance working at different scales and find themselves caught in a continuous network, never simply within an enclosure; yet, control does not dissolve, but is present, polycentric and occurs through many overlapping 'orbits'.

The new generation of school buildings: educational and design perspectives

Designing for education

The start of the 21st century saw an 'international wave of school rebuilding' (Mahony et al., 2011, p. 345). In this context, although focussing largely on European and American case studies, architects and architectural theorists took a renewed interest in the school as a building typology (Chiles, 2015; Dudek, 2000; Hertzberger, 2008). This work argued for the importance of design in education and the impact of school architecture on its users. Designed to be transparent, porous, versatile, and adaptable, this new generation of school architecture aimed to reflect more dynamic and democratic educational values. Emphasis was placed on the creation of flexible and open spaces (Duobliene, 2018; Wood, 2017, 2018), providing an opportunity for the building fabric to flex according to shifting educational requirements and needs (Kemp, 2015) and facilitating interactions (Kariippanon et al., 2019). This new type of school building does not rely on fixed spaces of enclosure but rather functions through constant modulation, mediation of experiences and regulation of dynamics circuits (Yaneva, 2010). As such they have affinities to the new generation of science buildings (Blackwell, 2022) and function as 'performative' machines 'meant to manipulate time and space' (Thrift, 2006, p. 292).

In the UK, this new generation of school building emerged largely through the BSF investment programme. Launched in 2003, under a Labour government, BSF was an ambitious programme, intended to run over a 15-year period and with a £45 billion budget aiming to rebuild or refurbish every secondary school in England, before being cancelled in 2010 by the Education Secretary of the newly elected conservative-liberal democrat coalition government. The country's existing school building stock was deemed inadequate in its ability to provide for changes in pedagogy (Cardellino et al., 2009, p. 249) and the BSF's approach of 'rebuild and renew' sought to bring about a new generation of 'inspiring' school buildings deemed to hold the capacity to increase motivation (Kraftl, 2012, p. 863) despite a lack of empirical evidence to assert such a relationship in the long term (Woolner et al., 2007, p. 58).

Architecture was positioned as central to the future of education and the materialization of the 'promise' inherent in the BSF scheme. In practice, this often took the form of 'flagship spaces' such as the large atrium. Such spaces were framed as a catalyst for broader change (Kraftl, 2012, p. 863) and endowed with the task of both signifying political aspirations and fulfilling functional roles (den Besten et al., 2011, p. 23). Yet, despite intentions to create unique school buildings, the BSF approach was criticized for its lack of clarity over its specific aims (Mahony et al., 2011). Furthermore, methods of procurement and realities of standardization and building regulations led to the production of often strikingly similar BSF designs (Kraftl, 2012, p. 864).

Despite the importance of understanding the educational politics and the pedagogical visions inscribed into BSF designs, little attention is paid to the day-to-day spatial realities of schooling. Both architectural scholars and geographers of education explore the material school design in intersection with educational governance or as a projection of educational policy. The analysis remains within these molar categories. To explore how these schools are experienced by all dwellers, it is necessary to consider work which has been centred on schooling as practiced.

Space and practices of schooling

Architectural research on school environments remains limited in its focus (Daniels, Tse, et al., 2019, p. 220), often exploring environmental factors (natural daylight, air quality, acoustics, temperature control) and physical features (size and openness of class rooms) and their impact on learning practices, well-being, attendance andacademic attainment (Barrett et al., 2015; N. Bennett & Hyland, 1979; Horne-Martin, 2002; Leiringer & Cardellino, 2011; Woolner et al., 2007). Yet, this type of research, confines itself to the interaction between pedagogic activity and the physical parameters of buildings and shows how building design endorses specific learning visions. School buildings are largely understood as static physical frames providing environments for fast-evolving schooling activities and educational philosophies.

The work of geographers of education (Holloway et al., 2010; Kraftl et al., 2020) has done much to highlight the spatial nature of educational practices and to acknowledge the complex spatiality of school architecture. They analysed the fragmented 'micro-spaces' of schooling and the ways such spaces gain meaning in practice, contributing to the making and remaking of children's identities (Holloway & Valentine, 2000; Valentine, 2000). Intensifying the dialogue with architectural scholars, studies have recently begun exploring examples of new and historic school buildings (Grosvenor & Rasmussen, 2018) and engaging in careful assessment of the impact of the alternative geographies of schooling (Kraftl, 2013). Inspired by a new materialist understandings of school architecture (de Coninck-Smith, 2016), these studies shifted the attention to the role of material school design in promoting new pedagogies related to training emotions, curiosity, creativity, and even boredom (Sobe, 2018), thus acknowledging the affective responses to school environments. Drawing attention to a fine-grained analysis of the material architecture of educational environments, these studies marked a clear tendency to tackle explicitly the role of architecture in the 'making' of schools by scrutinizing specific processes of planning, consultation and design. Away from formalistic

understandings, design is understood here as a process, a device for moulding students' affections and attachments.

Yet, despite the growing attention to the role of design for pedagogy, there are very few empirical explorations of how new school material environments come to matter in the working lives of staff and students (Blackmore et al., 2011; Burke & Konings, 2016; Daniels, Stables, et al., 2019). The analysis of contemporary schools remains largely detached from the physicality of the buildings and the specific architectural devices mobilized in shaping schooling experiences. Moreover, 'experience' is often framed in the repertoire of post-occupancy studies (exploring the impact of environmental issues of acoustics, lighting and temperature) that fail to understand how buildings and school dwellers interact dynamically and socially (Daniels, Tse, et al., 2019, p. 215). Tracing the symbiotic relation between architecture and pedagogy, we can conclude that the literature revolves around two questions: the question of how buildings reflect educational policy and translate pedagogical values (architecture as a *projective* surface), and the question of how, in turn, specific designs and patterns of use can affect educational practices and behaviour (architecture as a shaping force). Yet, architecture in both cases is understood in a limited way.

Circumventing both the projective and instrumental interpretations of architecture, recent work in the field of geography has emphasized the complex and dynamic interplay between instructional space, teaching and learning *in practice*, placing a focus on agency. Education scholars have gradually begun to embrace an understanding of buildings as dynamic and mediating environments rather than passive decors of educational activities by drawing attention to the *mediating* role of architecture in helping or hindering educational programmes (Daniels, Tse, et al., 2019; Gislason, 2010).

Drawing on geographies of education and this recent trend of unpacking dwelling in schools as constitutive for the understanding of education as a process (Kraftl, 2006), our study moves from typical molar frames of analysis, where schooling is interpreted through the lens of policy, class, genre or other categories, and towards a molecular capture of the often imperceptible rhythms of dwelling (Deleuze & Guattari, 2013; Merriman, 2019). We expand further the analysis of *schooling as it is practiced* by underlining in particular the active role of contemporary school architecture in *mediating* the various forms of polycentric control embedded in the pedagogical process.

Performing control

To map the spatialization of power in schools, studies in education often took as a point of departure Foucault's ideas of discipline and schooling developed in Discipline and Punish (2020). Underlining the surveillance capacities of schools, they described a type of educational philosophy based on supervision and social control (Simmons, 2010). The past three decades, in particular, have seen an increasing application of Foucauldian theory to different areas (Selwyn, 2000, p 246). These include teacher education (Hall & Millard, 1994), the increased use of CCTV in school surveillance, the different ways of resisting the panoptic gaze (Hope, 2010), and the principles of inspection in educational processes, such as Ofsted in the UK (Perryman, 2006).

Studies of practices of surveillance and control within contemporary school spaces have received less extensive attention. Issues of authority – i.e. how teachers are granted

with authority as well as how students are made to play according to social rules – remain often disconnected from any spatial and architectural expressions. Foucault's work remains a powerful metaphor of a form of organized discipline transforming students into 'docile bodies' (Foucault, 2020) both within geographies of education and education studies. A number of studies have traced the specific spatial practices of surveillance in schools (Adams, 2022; Bussert-Webb, 2004, p. 103; Simmons, 2010). Notable examples include Pike (2008), who analyses the Foucauldian 'techniques of government' deployed during school lunch times, and Gallagher (2010) who details surveillance through sound in the school classroom.

After ample discussions on the basic principles of the Panoptic schema in schools, no one questions that schools are designed with a purpose of governance. Yet, little attention is paid to the ways the material architecture of school buildings operates on a daily basis to sift and modulate practices of control. Moreover, the modalities of control radically change as we move from traditional types of school buildings to the new performative designs. This shift away from the teacher-centred pedagogical approaches and the Foucauldian disciplinary technology towards student-centred environments that rely on a Deleuzian architecture of connectivity and flow (Dovey & Fisher, 2014) is yet to be fully empirically explored. It becomes crucial to understand how the porous, transparent and versatile architecture of the new generation of school buildings succeeds in efficiently containing learning activities and modulating control.

Such focus on control as practiced, suggests a move from *ostensive* to *performative* understandings of power, not as a given, but as 'something that has to be obtained by enrolling many actors' (Latour, 1986, p. 271). Rather than being an inherent quality of a person or object/built structure, power becomes an effect produced through various tactics and techniques and is amassed through the shaping of networks of people and things. Through an analysis of a BDP designed BSF building in Liverpool, UK, we will now detail this performative character of control, in contrast to the modernist school building it replaced.

The black-box and the machine

Throughout the analysis of the BDP school, the figure of the school building which it had been designed to replace, became a significant presence in the research. In each of the interviews, reference was made to previous buildings that the interviewees had worked at. In three of the four interviews, this meant referencing the George Whitfield designed building which the school had vacated in 2011 (interview 1 27 October 2021; interview 2, 14 January 2022; interview 4, 14 January 2022). In one instance (interview 1) the staff member had experienced this building as both a pupil and staff member. This building was often used to contrast features found in the BDP-designed school. Thus, in what follows the new school will be referred to as 'the BDP school' and the previous building as 'the Whitfield school'.

The Whitfield school was designed around a main block, completed in 1961. It followed a modernist, 'black-boxed' design typical in the UK in the 1960s, replicated on other sites. Extensively glazed along two sides, the design supported maximum teaching space with minimum circulation space. Long corridors ran from one side to the other on three of the four floors. Each function contained in the building, from teaching space to staff rooms, was reduced to one of many doors leading from these corridors. In contrast, the BDP building, like

Figure 1. BDP (2011) designed school: Central atrium, image by trafi-prats, L (28/11/2021).

many BSF buildings, was centred around a multi-functional atrium, containing space for circulation (allowing access to classrooms, offices and a central theatre) as well as for dining, studying, socializing, and 'informal learning' (BDP, 2008, p. 6), all of which are allowed to overlap (see Figure 1).

Two very distinct pedagogical logics underpin these schools. The rigid, cell-like arrangement of the Whitfield school, with the corridors transporting students from one surveilled space to the next represents a teacher-centred Foucauldian disciplinary technology, contrasting with the student-centred flexible architecture of the BDP building that embraces a Deleuzian logic of connectivity and flows. The former relied on spaces of enclosure, the latter on the modulation of actions in order to exercise control. In the following, focussing on the BDP school, we will highlight the architectural devices built into the school to enable control, and their use in practice, exercised in conjunction with multiple lines of sight and sound.

Crafting togetherness, engagement and control

While long corridors are often experienced as spaces with rich social lives (Hurdley, 2010), common in traditional school buildings such as the Whitfield school, they also can accentuate divisions. One teacher commented on her experience of previous schools, where there was:

> […] the science department on one corridor, and you never see the geography department which are on the other side of the building, through 7 different corridors and 20 different doors (interview 3, 14 January 2022)

Divisions, drawn along disciplinary lines, would be reinforced through having to trudge down long corridors, encountering numerous doors. In the BDP school (as in many BSF buildings), such fragmentation was avoided by bringing circulation into the central atrium and along 'balconies' overlooking the atrium on each floor, which the architects ambitiously compared to Frank Lloyd Wright's design for the New York Guggenheim Museum. This, they suggested, would 'help make sense' of the school's interior spaces (BDP, 2008, p. 28).

The atrium could be used to produce a sense of the *school as a whole*. Through the atrium, the entire school could be addressed at once (in the case of an assembly), and visual connection and interaction between different school dwellers could be facilitated. This use of atria as a means of breaking down physical boundaries between departments is a design tactic used widely in higher education buildings (Yaneva, 2017, p. 59). Boundaries between functions in the school would also be eliminated and would overlap with, 'furniture and fittings, rather than other physical barriers' being used to 'define the character and use of the spaces within' (BDP, 2008, p. 28). As noted by the architects, the space, which they referred to as 'the heart space', should become lively and busy:

> The heart space belongs to the school as a whole. It is anticipated that it will be populated at all times of the school day by a cross-section of the school demographic, including staff, pupils and occasionally by community users and other guests. (BDP, 2008, p. 28)

Community was a central focus of the BSF scheme, and spectacular spaces intended to convey the 'promise' of the scheme to local stakeholders (den Besten et al., 2011), but they could also be seen as a mechanism to reimagine the school internally by encouraging interactions between staff and pupils (Cardellino et al., 2009, p. 259) and so perhaps softening hierarchical divisions.

Alongside this attempt to build a sense of togetherness through the building's atrium, clusters of classrooms (termed 'learning houses' by the architects) are centred on the corners of the building's square plan, hosting departments and year groups and breaking the school into smaller-scale units. These learning houses should, according to the architects, 'provide a place of familiarity', feeling both 'integral to the heart of the school' but with their 'own sense of identity corresponding to its year group "residents"' (BDP, 2008, p. 29). The architects state that, within these spaces 'the boundaries between learning, socialising and pupil support are blurred' (BDP, 2008, p. 29). This is illustrated in the semantic analysis network map generated on the building's Design and Access document (Figure 2). The 'Learning House' concept can be seen here to be mentioned often alongside terms such as 'pastoral model' and 'pupil support', demonstrating the extent to which these clusters of classrooms were supposed to produce close-knit communities of teachers and pupils. This is accentuated further by open classrooms which were planned for the centre of the learning houses, and movable walls in the surrounding classrooms to enable a variety of configurations depending on the desired teaching style.

Contained within these mechanisms for crafting connections and dynamically regrouping people and things, are also the mechanisms of surveillance and discipline, of identifying misbehaviour and encouraging engagement and obedience. The many *lines of sight*, serving to connect the school community and its various departments, are designed to observe and scrutinize any pupil deemed out of place. The long corridors of the previous Whitfield building were described by one
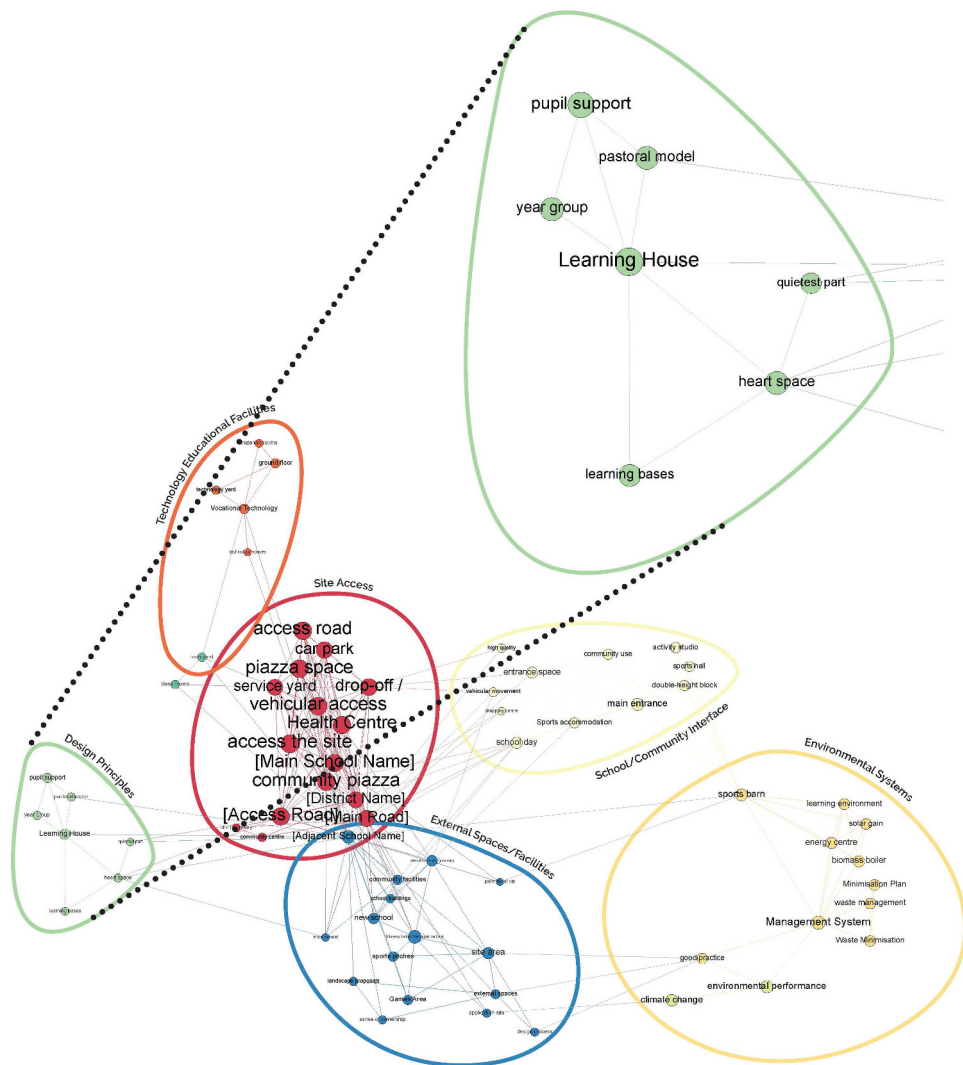
Figure 2. Semantic network map of the design and access statement for the school, created using cortext (https://www.cortext.net/) and Gephi).

member of staff as a zone which could easily escape the disciplinary gaze of teachers. Despite the long corridor having long been associated with Foucauldian disciplinary space for its clear sightlines (Casella 2006, 29 as cited in Monahan & Torres, 2010, p. 8) to this staff member, in practice, the corridor could easily become a space which nobody could see or control, and thus foster bad behaviour the moment a pupil was sent out of a lesson (interview 1, 27 October 2021). In the new building, however, the atrium and balconies proliferate sightlines allowing teachers and staff members to catch sight of unsupervised or misbehaving pupils (see Figure 3). Pointing to a plan of one of the floors, the staff member highlighted that a pupil sent out of a lesson should immediately be in view of the central classrooms in the learning houses, where the head of department is located. She
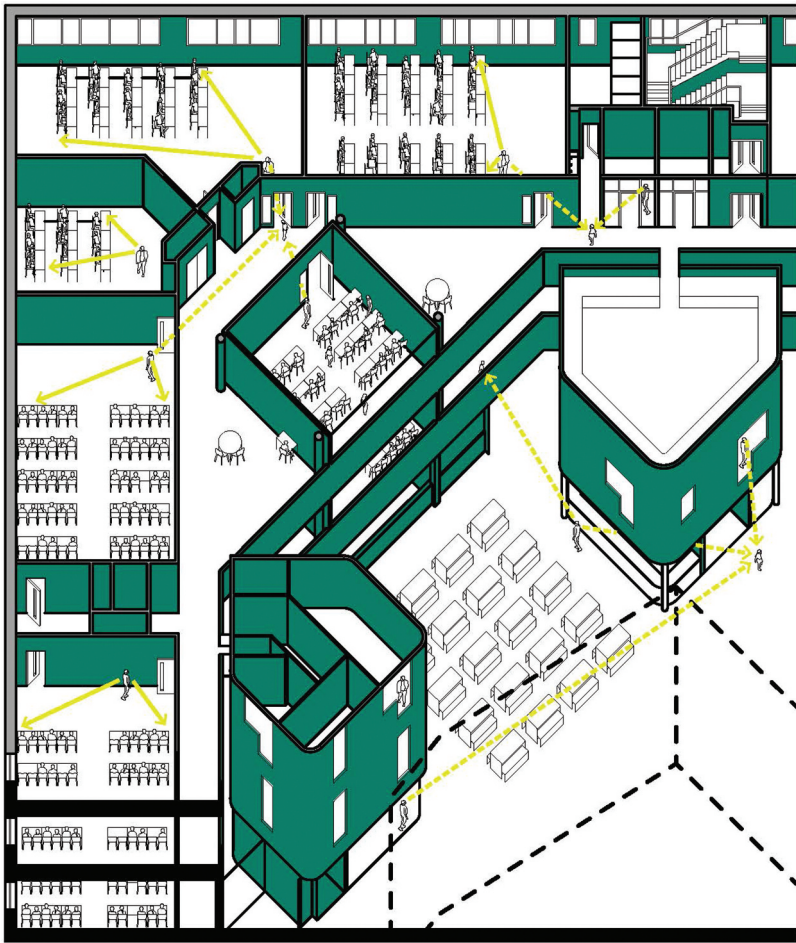
Figure 3. Axonometric diagram of sightlines of the BDP (2011) school building, showing significant passive surveillance of circulation spaces.

continued: 'but [. . .] even if they miss that child coming out, as soon as they walk, they can be seen anywhere' (interview 1, 27 October 2021).

The building contains 'no "hidden" spaces, corridors or corners providing opportunities for bullying' (BDP, 2008, p. 56). Glazed offices were intentionally dispersed throughout the school and positioned to overlook circulatory spaces (BDP, 2008, p. 11). Toilets, considered potentially ungovernable space, were placed strategically between classrooms and offices to ensure no pupil can enter without being seen. As a further means of detecting and avoiding misbehaviour such as vandalism, the sinks are brought out of the toilet area and placed in full view of the circulation space. This is an important move from enclosed and tucked spaces to open, interconnected spaces which support 'natural passive surveillance' (BDP, 2008, p. 56).

On an urban and architectural scale, visibility of spaces of circulation has often been connected to the elimination of unwanted behaviour (Vidler, 1978). Features such as wide streets, raised promenades, arcades, colonnades and courtyards, the elimination of cul-de

-sac's and 'blind alleys' have long been used as mechanisms to render circulation spaces visible not only to the disciplinary gaze of authority, but also to the self-surveillance of the public, who becomes simultaneously the object and subject of policing (T. Bennett, 1995, p. 48). Here, the school, reimagined as a micro-city, or a 'a model of a city-in-miniature and thus a potted version of the world' (Hertzberger, 2008, p. 9) with pupils granted greater freedom of movement, deploys similar mechanisms. The multiple lines of sight in the school's atrium, it could be argued, was intended to facilitate a similar type of self-policing, with both staff and pupils constantly reminded of the school community and their place within it.

Yet, it would be misleading to suggest that the mechanisms of control work purely through a non-hierarchical 'community surveillance'. Following, Valentine's (2000) study of the micro-spaces of the school lunch break, it could be assumed that the normalizing judgement of pupils may be tied up with expectations very different from the behaviour deemed as 'good' by teachers. Despite the absence of any central tower from which the entirety of the school can be observed, we can witness some of the hierarchical panoptic effects still at play in the school design. A central dynamic of the panopticon was that the prisoners would be coerced into monitoring their own behaviour, because of the unverifiable presence of the guard in the central tower. While the disciplinary gaze in the new generation of schools is discontinuous and partial, the fact that it is exercised by multiple viewing points at different times could induce similar effects. The long corridor may offer a simpler and perfect line of sight (from one end to the other) in which a teacher could appear at any moment and catch misbehaving pupils, but such an arrangement could become easier for unsupervised pupils to ascertain exactly the positions from which they could be seen. The sheer number of both vertical and horizontal sightlines in the BDP school, and the fact that surveillance would happen during the ordinary comings and goings of staff during the school day makes any such assessment more difficult. Here control becomes multiple and *polycentric*; the disciplinary gaze is diffuse and partial but still hierarchical in nature. Its unverifiability is enacted through the proliferation of sightlines, rather than through power's invisibility.

Following Foucault, we could also suggest that the building design looked not just to *repress* particular behaviours (bullying, vandalism, etc.) but to *produce* a particular kind of learning environment, which is open, inclusive, and democratic. The architects describe the atrium as a space which will encourage 'full participation':

> the heart space is to be a joyous and uplifting space, inclusive to all in the school and encouraging full participation in the social learning aspects. (BDP, 2008, p. 28)

The school is thus designed as a *machine for producing engaged pupils, embedded within a community*. Yet to assume that such design intentions, no matter how carefully crafted, perfectly reflect the day-to-day life of the school would be misleading. Teachers, pupils and staff work within, negotiate and reshape the building through their practices of teaching, learning and socializing. Once becoming part of the everyday life of the school, these architectural mechanisms for controlling, ordering and encouraging particular behaviours, could fail, be contested, come into conflict, or could be used in more creative ways unforeseen by the architects. No longer moving from one space of enclosure to another, and instead experiencing the flows of the 'micro-city' (Hertzberger, 2008), those subject to the disciplinary gaze may be free to go in and out of what we will call, following

Deleuze, the 'orbits' of many potential viewers. Such orbits bring pupils in and out of relation with a constellation of centres of control, working through many overlapping trajectories, without a single source or origin.

Orbits of control

We will now detail some of the everyday practices through which pupils, and at times teachers, are brought within the 'orbits' of control of authority figures, mediated through the materiality of the building. Such instances are partial, discontinuous, and often rely not only on sightlines but also sound. During break times, a low hum of noise – 'white noise', as one pupil referred to it (Group 4, 09/02/2022) – emanates from the atrium, audible from most parts of the school. Occasionally, the booming voice of a teacher on lunch duty can be heard, reprimanding pupils, or gently reminding them to watch their behaviour. The white noise fluctuates throughout the day, rising to a crescendo as the different year groups are released for lunch and break times. Despite a member of the management team claiming that the acoustic design features allow for only '[...] a low level of noise in the background' (interview 2, 14 January 2022), the space can become aggressively loud at certain periods of the day.

The atrium has successfully become a lively heart of the school: always busy, with pupils sitting at benches, talking to peers or studying, or bumping into friends on the way to lessons. Two members of staff noted that they felt more connected to their colleagues located in different departments and floors compared to previous buildings (interview 3, 14 January 2022; interview 4, 14 January 2022). It has also become a space conducive to the governance of the school. From the balconies above, 'you can see everybody' (interview 3, 14 January 2022), and even from below, glimpses of 'bobbing heads' appearing momentarily above the balconies, though partial and discontinuous, could alert staff members to pupils out of lessons or misbehaving (interview 1, 27 October 2021). Pupils described occasions where they or their peers had been spotted at the bottom of the atrium and had been scolded for missing lessons or for not doing their coursework during free lessons (1st December group 1; 15th December Group 1; 15th December, Group 2)

> [Art teacher] sometimes peaks over and looks to see who's down there and she'll see me there, either on my computer [...] or talking to someone if I have a free lesson. She's like '[shouts pupil's name]!' (15th December Group 1)

In contrast to the spatial arrangements analysed by Pike (2008), in which spatial practices in dining halls, in a classic Foucauldian disciplinary logic, looked to limit social interaction to maintain behaviour, in this case, the building itself encouraged social interaction, yet pupils were still reminded of the expectations placed on their behaviour by the sudden appearance of their teacher.

Discipline is not limited to the mechanisms anticipated by the design. One teacher described using a semi-circular seating arrangement in her classroom in order to increase visibility of pupils and encourage participation, ensuring that the pupils 'have to buy into the lesson' (Interview 3, 14 January 2022). If the relationship between classroom layout and control has been widely discussed (Horne-Martin, 2002; Woolner et al., 2007), sound is a much less explored component in this equation. This teacher also described using the atrium as a means of controlling the class, saying that other than during examinations, she

would always leave her door open. On the one hand, she felt, this made her more approachable to the students, but also speculated that during lessons this had an effect of controlling the behaviour of the class since the pupils could be heard by others (including teachers and members of staff) outside:

> Having it open [...] I think it prevents them from potentially behaving in a way [...] that would be quite disruptive because everyone could hear it (interview 3, 14 January 2022)

The simple act of leaving the door open potentially evokes the presence of the wider school community (and members of authority within it) and reminds pupils of their place. The liminal space of the door, and example of what Brookes (2022) describes as an 'intimate architectural space', is here demonstrated as a means of mediating connection and control. The sound emanating through the open door of the classroom, potentially reaching others across all floors of the school, could also serve as an alert – summoning the presence of others. Though often considered only through sight, guiding and controlling bodies in school buildings involves different soundscapes and acoustic topographies, though these are, again partial and discontinuous (Burke et al., 2011; Gallagher, 2010; Goodman & Goodman, 2017).

The school was not without its blind spots. Pupils spoke of spaces known for misbehaviour:

> The back of the field is where all the younger years would smoke, [laughs] in the bushes. (Group 1, 26th January 2022)

> Do you know [...] the big, shaded area and benches? Sometimes kids are over there and try and sit to the side where teachers aren't [...] and try and fight. Over near the wall. (Group 1, 15th December 2021)

Such unplanned, 'transitory dwelling spaces' (Shortt, 2015) perhaps inevitably emerge and gain meaning in practice, feeding on blind spots in mechanisms of surveillance, and knowledge of them passed from student-to-student, year-group-to-year-group. Control is always more complex, more open to evasion than the descriptions offered in design documents, due to the multi-layered architecture of the BDP school (as opposed to the model of panoptic traditional schools). Even the toilets, so carefully designed to identify and eliminate misbehaviour were noted for being messy, and on occasion becoming spaces of vandalism and bullying (1st December, Group 2; 15th December, Group 2).

The sightlines and soundscapes that served to connect the school and through which control operated could also come into conflict. The open classrooms of the learning houses were almost immediately closed off to produce a traditional classroom layout, their openness being judged to cause too many distractions to lessons as staff moved throughout the building during lesson time (interview 1, 27 October 2021). Similarly, the library space which had occupied an area of the atrium, demarcated only by furniture and bookshelves, had quickly become too noisy for pupils to study and had moved to a vacant classroom. Division through walls quickly appeared as a central provision for certain aspects of schooling, echoing Hurdley's (2010, p. 61) argument that the 'organising cultures' of 'hierarchy and privatism', so strongly associated with the corridor do not necessarily disappear within the landscape of the open-plan building.

The blurred boundaries between the classroom and the atrium could also serve to intensify the issue of noise, making it difficult to control the extent to which voices carry:

'our English teacher's really loud, you can hear him from multiple floors away'.

'He's on [third floor], and he has his door open-'

'[. . .] I don't think he means to shout but he just does'. (26th Jan Group 1)

Caught in such a highly connected landscape, teachers could feel that they needed to moderate their own behaviour. In many of the offices, teachers could find themselves, in an inversion of the panoptic gaze, on constant display to others in the school (interview 1, 27 October 2021), creating an almost hybrid architectural panoptic-synoptic environment (Mathiesen, 1997). The finance office was placed (as part of the strategy of proliferating sightlines) overlooking the atrium, and due to security concerns (to protect the school's two safes) the office had to be far from the door. The room thus had no external windows and would overheat. The finance manager, often working alone in the office shared:

> I've been having the radio on, and because I shouldn't really have the radio on [. . .] I'm trying to keep the door closed so the noise doesn't go outside my room. (Interview 4, 14 January 2022)

In a sense, she found herself inadvertently disciplined by the required connectivity of the school's architecture. The 'stuffy' room with no external view that she now used contrasted with the office in the previous Whitfield building which 'had a great big, huge window that overlooked a cherry blossom tree' (Interview 4, 14 January 2022). This architecture of connectivity could have unintended consequences, and is constantly negotiated, sometimes uncomfortably, by all school dwellers. Never fully prescribed by the school design, but always mediated by it, control and discipline are performed through the materiality of the building in sometimes unexpected ways.

Thus, all spaces in the BDP school are highly connected, the sound and sight relations of the classroom to the school community outside, the atrium and its passive gaze, the circulation in space, all these show the many fluid and discontinuous mechanisms of control experienced by school dwellers. Rather than following linear chains of control, all dwellers move in and out of multiple overlapping 'orbits'. Deleuze describes that, in contrast to the 'disciplinary man', 'the man of control is undulatory, in orbit, in a continuous network' (Deleuze, 1990, p. 6). What this means in the context of school dwelling is that there is no starting point of discipline, but rather a twirling movement of 'putting-into-orbit'" (Deleuze, 1995, p. 121). Instead of responding to a steady effort of disciplining, searching for the origins of surveillance and the directionality of the gaze, the versatile architecture of BSF schools encouraged dwellers to join the constellation of orbits where they experience shifts, disjunctions, turns, subversions, and adjustments. No longer enclosed in space, the panoptic mechanisms of discipline are reframed and encompassed within these orbits where control proliferates and mutates, working horizontally and vertically, through different sight- and soundscapes, partial and porous, always open to negotiation.

Conclusion: the spatial 'nodes' of schooling

Overcoming the dualist understanding of education as an activity that happens in passive objective frames of learning (static buildings) or the subjective interpretations of users, in

this article we have outlined the symmetric interplay between buildings and people by fleshing out specific molecular practices of 'dwelling' in school buildings. Drawing on designers' plans and the daily experiences of school dwellers, we have explored in particular how control is facilitated by bespoke architectural techniques.

This study of the performative spatial machinery of contemporary school buildings speaks to geography of education and architecture studies in addressing the way both Foucauldian and Deleuzian ideas of spatiality have permeated these fields. To avoid both Foucault's panopticon and the Deleuzian architecture of connectivity and flow remaining mere metaphors, more empirical studies of how architecture mediates schooling *in concreto* are needed. While the panopticon was an architectural form conceived of as assuring 'the automatic functioning of power' (Foucault, 2020, p. 201), our study demonstrated that practices of 'dwelling' in buildings are never limited to the logics inscribed into their design but exist in a constant negotiation with them. As seen in the BDP school case study, its architecture looked to eliminate the disciplinary gaze, but its versatile and porous design did not dissolve control completely into a space of pure flow. Instead, new mechanisms of control were built into the school with the help of architectural devices (partitions, atria, corridors, sitting arrangements, glazed doors) which crafted the space with new lines of sight and sound.

Therefore, we can conclude: *first*, geography of education should further benefit from more granular empirical studies of the specific spatial techniques through which school dwellers are granted with authority and how they are made to play according to social rules. *Second*, to fully unpack the spatial choreographies of school life will require a more nuanced investigation of school architecture, one that would circumvent simplistic understandings of design as a pure manifestation of politics or pedagogical ideas, or as a passive container of activities. When followed in practice, architecture multiplies to a myriad of smaller devices and techniques, lines of sight and sound, apertures and closures; equally, the forms of control multiply in potentially unexpected ways, overlap and are open to negotiation and subversion. Control within contemporary school buildings could be seen as polycentric and in motion, working through different overlapping scales. A more nuanced understanding of architecture, therefore, will lead to a nuanced understanding of the mechanisms of control it mediates. *Third*, a myriad of empirical methods that capture both the discursive and non-discursive manifestations of schooling, is needed in order to capture the broader 'building events' in schools (Jacobs, 2006), the spatial variability of use, the versatile orbits of schooling and the numerous ways control 'percolate' through these orbits. The participation of a wide range of school dwellers, both human (teachers, financial officer, facilities manager, support staff) and non-human (doors, windows, corridors, sinks) is to be acknowledged as well.

Moreover, this article is also an invitation to architectural studies to overthrow blatant functionalist studies of use and quick post-occupancy surveys of buildings and to engage in careful and slow analyses of the practices of dwelling in buildings, to craft longitudinal and meticulous investigations of the various ways dwellers engage with and appropriate space, the rhythms of dwelling, the attachments, the speeds of circulation of control. The school typology provides one possible illustration. Yet, more nuanced symmetrical empirical studies of other typologies are needed to understand how buildings and dwellers interact dynamically and socially. This will ultimately set new questions for architectural scholars: 'If school buildings are no longer enclosures but rather modulate

schooling experiences, map the location of school dwellers, guide their actions and distribute control, how do other buildings work?' 'What if we cease to define architecture in metric or formalistic terms and explore it as a process instead?' 'If buildings are no longer static enclosures, but nodes of complex spatial networks of circuits defined by transitions, flows and movements, how can we study their performance in the future?' 'What methods can better capture dwelling practices as a set of navigational techniques, enabling movements, enhancing new lines of visibility and sound, changing speeds?' Here are some questions for a new emerging dialogue of geography of education and architecture studies and an invitation for both fields to abandon the existing spatial metaphors and engage instead in renewing the empirical tactics that will better grasp dwelling in action.

Note

1. The Design and Access Statement is a document which accompanies planning proposals in the UK and provides an explanation of the design and a range of other information about the proposal.

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Data availability statement

Data associated with this project can be found here:
    Trafi-Prats (2023). Mapping Spatial Practices and Social Distancing in Smart Schools: Sensory and Digital Ethnographic Methods. [Data Set]. MMU e-space. DOI: 10.23634/MMU.00631426.

Ethics

Project Title: Mapping spatial practices and social distancing in Smart Schools
    EthOS Reference Number: 35694

MMU Research Ethics and Governance
Health and Education Research Ethics and Governance Committee
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